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JUNE 1933

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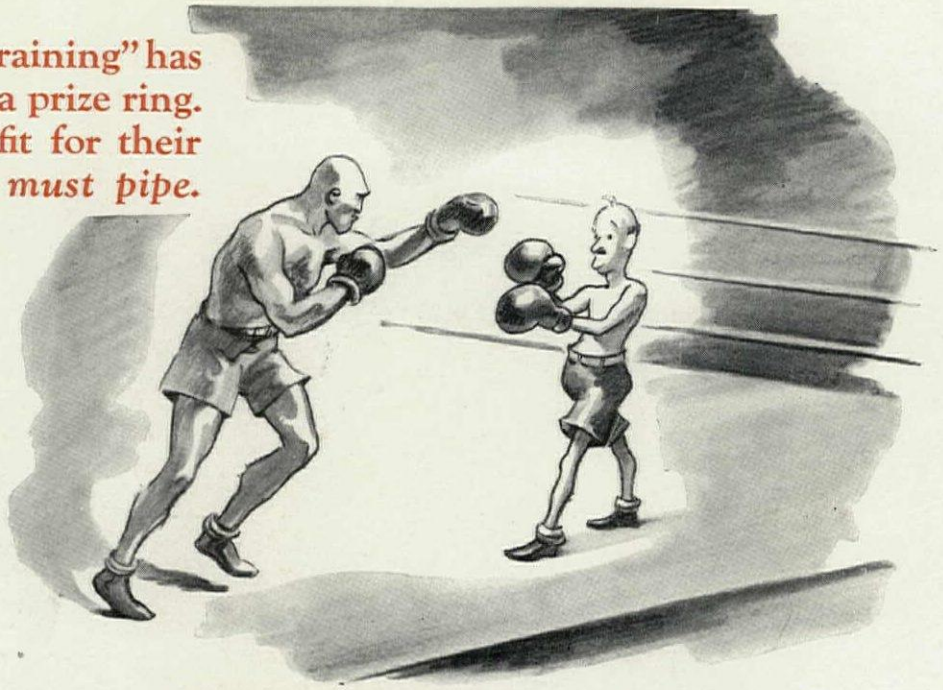

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PENCIL POINTS
Volume XIV June, 1933 Number 6

Chicago and Tomorrow's House?

By Frank Chouteau Brown

In the year 1893 a World's Fair was held, in the city of Chicago, that marked a turning point in the development of art in America. The Renaissance inspired architecture shown in the principal buildings of that Fair, reflected in the formal lagoons and harmonious landscaping treatment of the ample grounds, impressed all beholders with a distinct vision of beauty that was one of the most permanent and important recollections remaining from their visit of that year. It therefore naturally resulted that much of the architecture of immediately following years was distinctly influenced by the Classical style so impressively employed at Chicago in the Columbian Exposition. It everafter remains as an indissoluble part of the memory-vision of that summer in the minds of thousands and millions of Americans.

And now, again, in the summer of this year of 1933, the city of Chicago is setting up another "Fair," and again "inviting the World"—just at the moment a somewhat groggy and dizzy World—to come, look, and wonder. Another ideal of artistic character is to be set before the visitors, including many Americans. Another generation—in fact, some three or four of them—are looking forward to attending and being impressed by a new and more "advanced" idea of beauty. A strangely different meaning is being given the same old syllables; even the older generations may return again to consider the two contrasting standards —and, perhaps, to ponder!

For the strongest effect of that previous picture had been to give the nation an ideal of beauty best and most directly expressed in structures of a type nearly analogous to the "public building"—and America was at that very moment entering upon an era of the construction of such buildings.

What is to be the influence of this current "Fair" upon those who will attend it? They will see more and newer beauties of lighting and of developed and applied electricity; less static and old-world Classical architecture, for which has been substituted a new and probably transitory architectural ideal; less permanency of appearance; perhaps more economical and direct expression of material and purpose. They will probably see better "Fair buildings," as such, better adapted to and more expressive of their intended purpose, but still largely European in their derivation and still often substituting the merely bizarre and unusual for the intended modern and direct expression.

And what is that problem in architecture that most concerns the greatest number of people in America—or possibly in "all the world"—at the present time? Undoubtedly, it is that concerned with the building of a home that will be permanent, convenient, and attractive; and at a price that the less well-paid majority of the people can afford to pay! We commonly use the word "Housing" to represent this problem, although that term is employed far too vaguely, and often without any too exact definition of what we mean by its use, or even any certitude that we fully comprehend the idea that it presents.

But that, at the present time, even greater numbers of the American people than usual are becoming absorbed by the problem of securing homes at prices they can afford to pay, there can be no doubt. That a proper and widely available solution is fundamentally essential at this time, especially as an underlying or basic ideal of American "standards of living," is also readily granted. That a large majority of the Chicago visitors will be extremely sensitive to ideas dealing with economically successful types of single-family dwellings is a foregone conclusion. Therefore, if the "sample houses" now being completed at the Fair are properly presented by the several manufacturers concerned and made sufficiently attractive to reach and intrigue the visitors, this exhibit may become important in marking a point from which the future treatment of the detached single-family American home may take on a different type of development that may become traceable far into the future. Whereas the former "World's Fair" gave to America a better and more impressive type of public building design, will it turn out to be a fact that the Fair of this year will establish any new standard of advanced house design?—at the moment undoubtedly one of our most eagerly awaited products! Is it possible that we are actually developing new building materials more cheaply and better adapted to meeting the requirements of our varied climate, as well as the needs of the home builder and owner of the present and future generations? If so, that fact will be welcomed by a large proportion of our present population, and it should be a matter of intense and vital interest to the architect, as well as to all others included within the many trades associated with the building industry.

That the possibilities are as completely revolutionary as those that affected the amusement "business" of this

country when the change from the silent to the vocal movie became an accepted fact, should be evident to all who have been cognizant of the conditions still existing to affect our entire building industry. At this particular moment, everyone concerned is "waiting to be shown" any among the many experimental new building products that will be cheaper, as well adapted, as easily distributed, and as flexible as those building materials to which everyone has hitherto been accustomed. Once any such new materials have been accepted as meeting these essentials—have been proved as being as adaptable to meet requirements of weather resistance, wearing qualities, permanence, and ease of handling, along with cheapness of manufacture and distribution—the architects of the country will soon discover ways and means of using them that will be economic, simple, and beautiful. Of that, there can be no reasonable question or doubt. But it is these inventions that, at the moment, are still being awaited!

No builder considers present labor-wasting materials as ideal. They require the application of too many individual pieces to be economical—no matter how cheaply manufactured each unit may be. No architect regards the resulting surfaces—full of lapping edges, or crevices, or joints—as ideal in appearance. Long usage has accustomed the human eye and mind to their defects and incongruities. They have proved in practice to be flexible and adaptable, as well as sufficiently permanent and artistic in effect. As a matter of fact, the permanence is only achieved by means of continued expense for painting or pointing the surfaces and crevices which are accepted as sufficiently artistic in effect only through long custom, and by making essential defects in the materials the means of securing pleasing minor variations, along with the inherent harmonious effect of human scale and relation to the human beings who inhabit these man-made dwellings!

Most existing materials have finally come to possess historic associations of style not essentially inherent in them originally but gradually acquired—"unearned increment," as it were—through generations and centuries of use in many lands and widely different climates. But it should also be plainly realized that these long established "style associations" are not in themselves really inherent, but merely those that we have come to associate with them. Most certainly it does not mean that these familiar materials are not susceptible of being used in new ways, nor that it is not possible to adapt them to meet new conditions. In fact, history furnishes us with many instances in which they have been very successfully so adapted.

More definitely it should be stated that a so-called "modern" or "new" style does not *require* the invention of new materials. According to history, at least, it never has in the past. Therefore, in all probability it need not be a requisite essential for the present nor the future, though we have been rather prone so to regard the matter. It *does*, however, require a certain freshness of outlook; an ability to break away from established or conventional lines or directions of thought; an originality of approach upon the part of its designer.

It might also be that the invention of a new building material *might* just conceivably (possibly because of some essential newness of principle or application involved) be the basis of suggesting some new method of applying that material to the more pressing problems confronting architecture of today and tomorrow, from which we might develop some new suggestion of appropriate "style" as an almost inevitable by-product. On the other hand, it is more than likely that a new style evolved from the invention of a single new material would not be broad enough in its application to the problems involved in the art of building to cause it to be suitable to meet all the requirements of modern architectural design.

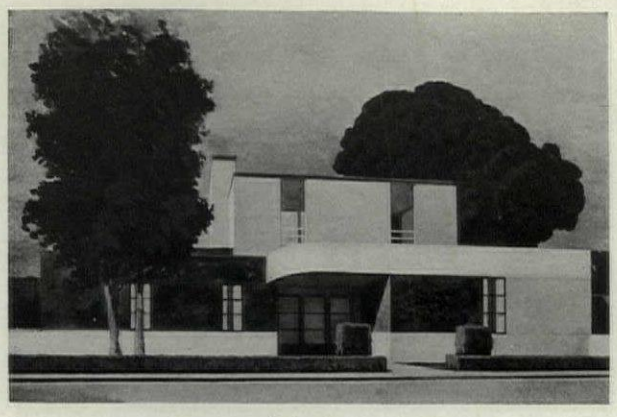
Rather it would appear more consistent and desirable that any new style of design—if it evolved—should arise naturally from new and more logical methods of thinking, or in confronting new problems of economic construction, without being trammelled by existing historic architectural precedent—or limited by the possibility of realizing it exclusively in a single new material!

As a matter of fact, in the construction of modern buildings we have for some time been cognizant of the economic logic of a preferred use of larger units of factory-made material, capable of being set in place more simply and quickly—and at an economy of labor—because they would cover a larger surface per operation upon the structure's façade. Yet we have not so far—even after several years of confrontation of this fact—been inspired to produce a new and logically inevitable "style-solution" such as would be generally accepted as wide in its applicability and satisfactory in its economic and artistic possibilities.

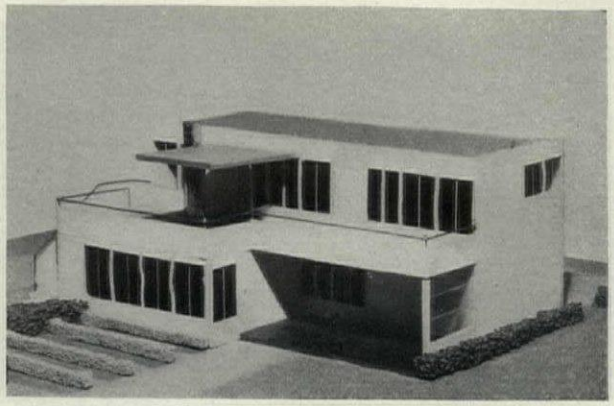
If pre-fabricated products can be devised for machine-shaping in units capable of being economically transported to a site, and rapidly erected with inexpensive labor, in a few uncomplicated operations, into a house that is satisfactory in appearance, durable, practical, and flexible in material and arrangement, there is no doubt that it would meet a long expressed demand and prove a much desired boon to families, factories, and communities scattered all over this, as well as many other countries.

It is toward this end that many material manufacturers have been working, and so at Chicago an area upon the lake front has been placed at the disposal of these interests. A limited number have each actually erected and decorated a demonstration house, showing the possibilities of their materials in a form that can be readily seen and realized by all visitors who may be interested in that problem. And so ten or a dozen houses, some of which are here shown or described, are now built and their furnishing and decoration is being completed.

Already it appears obvious that, artistically, still far too much is left to be desired. Probably few will be willing to accept even a single one of these house designs as being altogether satisfying and beautiful in this regard. Others are too novel in shape or form or material to be generally acceptable to the normal home owner. Everyone could wish that the number had



MASONITE HOUSE
Frazier & Raftery, Architects



DESIGN FOR LIVING
By John C. B. Moore and Horsley & Wood

been larger and that more materials and different types of design, now lacking, had also been included in the group. It is probably obvious that more architects—and some accepted architectural organization—should have been invited to undertake the whole matter—and upon a broader basis than has actually been done.

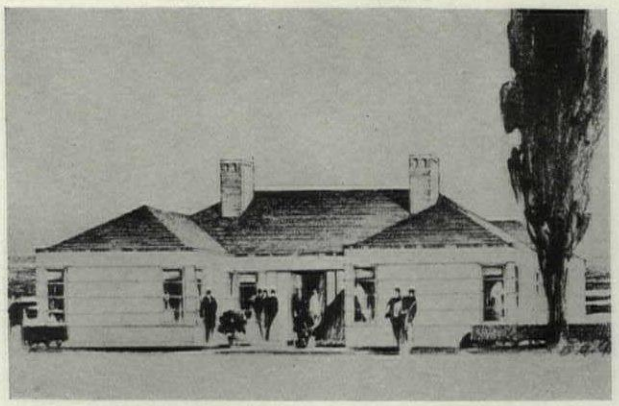
Almost one's first reaction, after glancing over these designs, is to feel that more thought and better minds are yet needed before we can achieve the best realization of the possibilities lying dormant in these various materials. No matter how well justified experience may prove these inventions to have been, a great opportunity to have caused thousands of people to have realized that fact, within a very limited time, has been partly lost because of the failure to have these same ideas presented in the most effectively artistic and dramatic manner, *this* summer, at *this* Fair.

Too many spectators will be likely merely to jump to the conclusion that what is here being shown is representative; that if that is the best that can be done in the field of new ideas in economic home building, back to the old love for theirs! A conclusion that must be regarded as based upon unfortunately false premises. And one that can hardly redound to the immediate benefit of the industry of the building of homes—a matter at the moment of vital import to all North America, far exceeding the interests of the few manufacturers here involved!

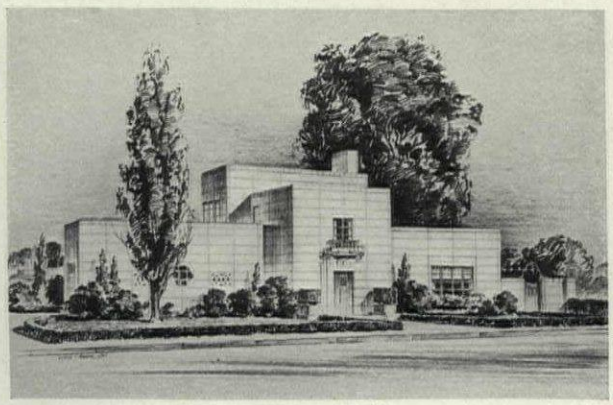
For it is a definite and certain fact that one of the very first expressions of a return of business to better times in this country will be noted in the start of building of small houses.

It is perhaps natural that most of the houses built at the "Fair" have been expressed in a style that we have mistakenly come to call "modern"—an appealing but often meaningless word. It is supposed to represent that appearance that results naturally from a more direct and logical use of materials. As a matter of fact, it seldom accomplishes anything of the kind! It is no more representative of the methods, materials, or manners of the present day than were the Renaissance palaces shown in Chicago in the Fair of forty years ago representative of the America—or even the Europe—of *that* time! They were interesting and romantically appealing to the visitor from the fact that their beauty was of a type that was rare and new to him. They represented, however, nothing of the purpose of the structure, nor of its methods of construction.

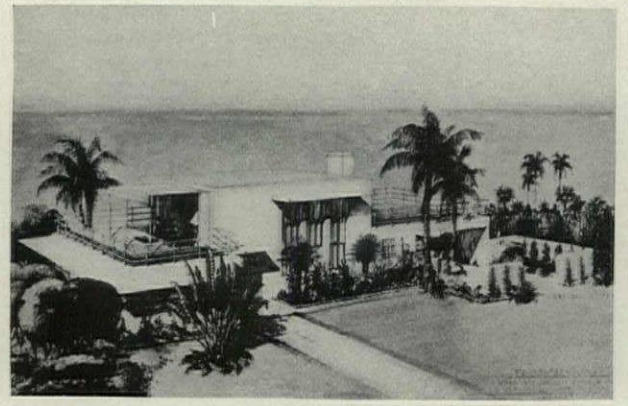
The Fair of 1933 will show some exposed methods of structural support, it is true—though hardly in ways that will be universally accepted as inherently beautiful. Some of these houses may be recognizable as human habitations, though usually of a form that will be strange to most visitors. Others will not at first so suggest themselves to the observer. But at least it would seem a little unfortunate for the manufacturer that, in some cases, his material—often quite capable of well merited use in construction of the day—should



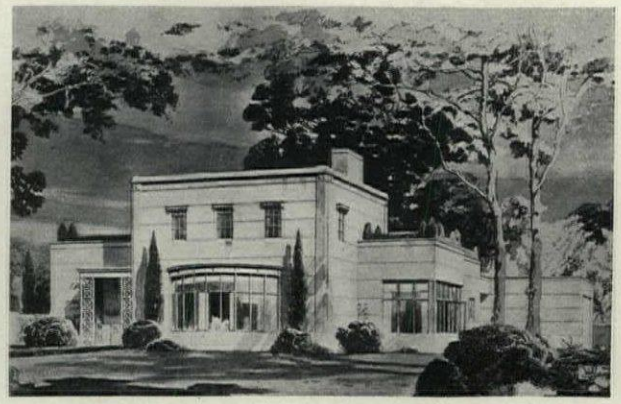
AMERICAN FOREST PRODUCTS HOUSE
Ernest A. Grunsfeld, Jr., Architect



ROSTONE HOUSE
Walter Scholer, Architect



FLORIDA TROPICAL HOUSE
Robert Law Weed, Architect



STRAN-STEEL HOUSE
O'Dell & Rowland, Architects

have been thus first presented to a possible buying public in a manner that must confuse the issue for many observers and leave them with a confused notion that the strangeness of the house forms in which they are being shown is something essential to the materials employed, rather than as merely incidental to them. In this way their adoption may be unduly, and unfortunately, restricted.

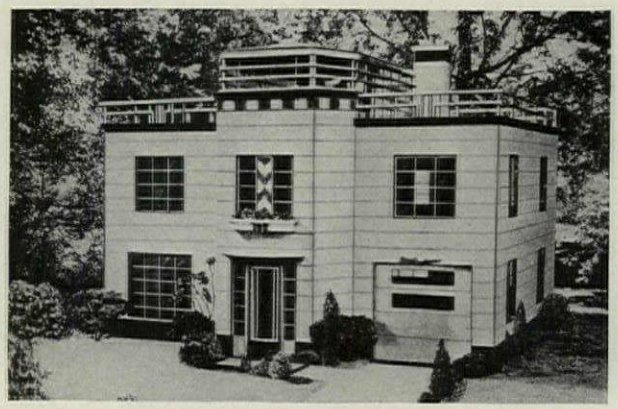
For one thing, no apology need be made. Outdoor life is coming more and more to form an important part of present-day living. That fact is apparent in many of these designs. It appears generally in the flat roofs; and the substitution of "roof gardens" for older fashioned "porches" is a mere reversal to oriental and even pre-Biblical times and manners. It is even older than it is "new"! It goes back to the architecture of Egypt, Persia, the "hanging gardens" of Babylon! As so often happens, it is historically so ancient that it has once more become "new."

Of the houses illustrated, two comply with most of the recognized peculiarities of the Continental "Architecture Moderne" in their design. These are the "Masonite House," by Frazier & Raftery and the "Design for Living," by John C. B. Moore, with Horsley & Wood, Associated.

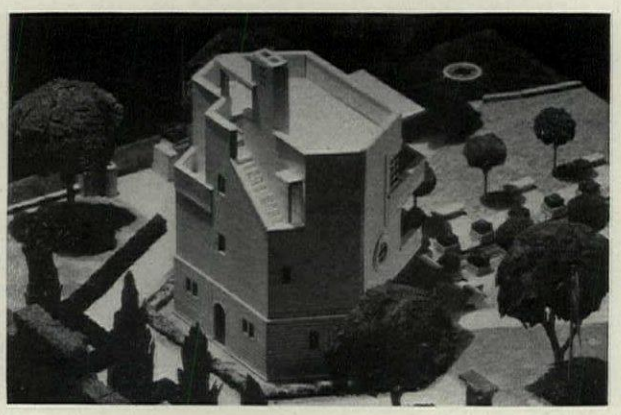
The first-named design places four rooms upon one floor, with a hall of seemingly unnecessarily large area to serve any useful purpose. A considerable economy easily might be effected by reducing its size, opening it more out into the Living Room, and so making a considerable reduction in the area, and accordingly the cost, of this design. A serving pantry between Kitchen and Dining Bay would also seem authorized in so ample a plan. The Living Room, 21 x 25 x 12 feet high, is not especially well proportioned. What appears in the perspective as a second story is merely a roofed terrace, with enclosed staircase hall carried up to that level, leaving a considerable area of open housetop for the use of the occupants. The garage is given space upon what is shown as the west (front) of the house. It would appear that the entire usefulness of the house would be bettered by orienting the front to the north. Along with most of the other houses illustrated, no cellar is contemplated. The construction is not startlingly novel, being of wood studs covered with Masonite and plywood panels; and the exterior suggests the excellent possibilities of variety obtained by the use of differently toned areas on the wall surface.

The "Design for Living" house plan is rather crowded upon the first floor and unexpectedly spacious upon the second. The kitchen appears too much condensed—especially as no separate china closet is provided—while the dining space is also too constricted. Upon the other hand, the irregular arrangement of the Living-Library-Dining Room possesses distinct and interesting possibilities.

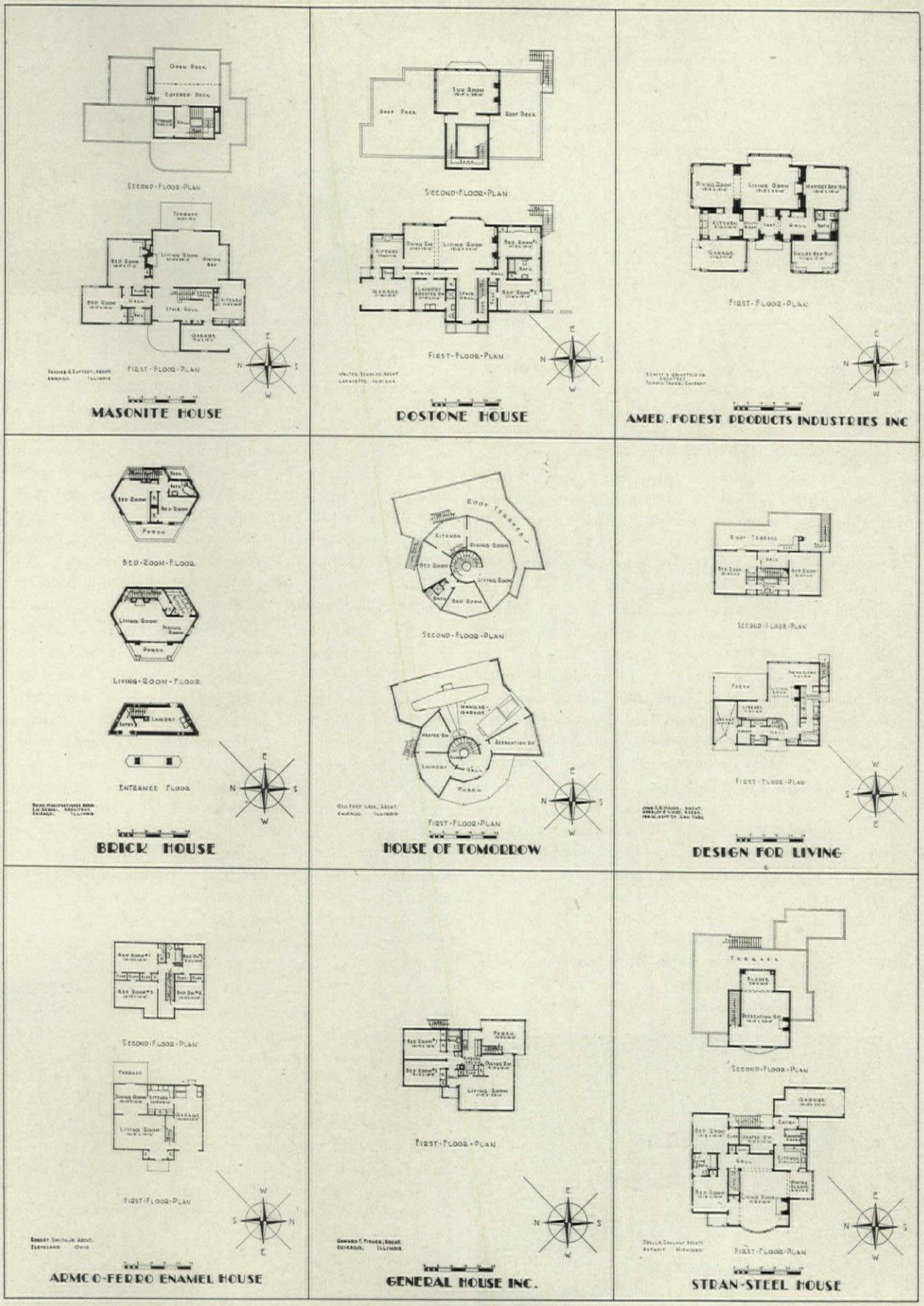
From the model, the exterior appears to be too conventionally "modern" in its stylistic expression to be



ARMCO-FERRO ENAMEL HOUSE
Robert Smith, Jr., Architect



BRICK HOUSE
Andrew Rebori, Architect



PLANS OF NINE OF THE HOUSES SHOWN AT THE FAIR

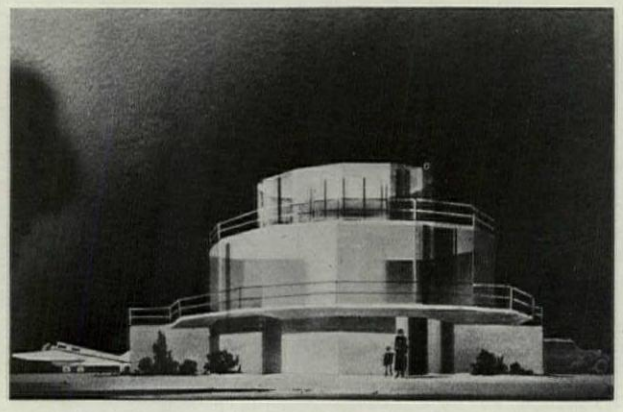
very interesting as such. The plan is based upon a four-room unit, with attached garage, and the frame is of wood stud surfaced with large "Homasote" sheets.

"The Armco-Ferro Enamel House," designed by Robert Smith, Jr., has seven rooms of rather ordinary and inflexible proportions. No frame is used, but the 3½"-thick walls are compounded of long box-like steel units, filled with rock wool, their Armco iron surfaces finished with vitreous enamel. The roof is flat, partly roofed over, and color is introduced into a few decorative panels.

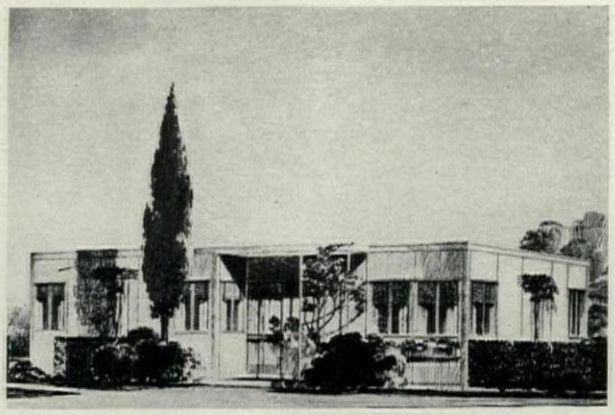
The "Stran-Steel House," O'Dell and Rowland, Architects, has a fabricated steel frame, the members being made of two channels back to back. It is surfaced by enamel finished sheet steel plates, insulated upon the outer face, and with Celotex and Sheetrock upon the interior, all nailed into place. "The estimated cost is $7900" (sic), and the house has five rooms upon one (the first) floor, with a covered and enclosed "Recreation Room" opening on the roof terraces at the second floor level. Again the orientation of the house would seem capable of being much improved by placing it with the entrance front facing the south. Its principal rooms suggest interesting decorative treatments as being possible.

The "Rostone" House, designed by Walter Scholer, is architecturally more interesting and is also of steel frame, surfaced with a thin manufactured slab material made of limestone and shale, with bolts cast into position for attachment to the steel frame. The surfaces of these slabs may be polished and given different colors and textures. The same material is used for parts of the walls, and for the floors on the roof terrace and hall. Six rooms are arranged on one floor, with sun-room and hall continued to the roof story. The plan—which can hardly be regarded as an economical one—would probably work out better if reversed and faced to the north. A much better planned Rostone house, designed by the same architect, has been built at West Lafayette, Indiana.

The "General House, Inc.," Howard T. Fisher, Architect, is another design to be built of steel units, without frame, at about $3500 for a four-room, and $4000 for a five-room plan, all on one floor, with flat roof deck. The structural scheme for this house is based upon a steel chassis bolted over cement piers,



HOUSE OF TOMORROW
George Fred Keck, Architect

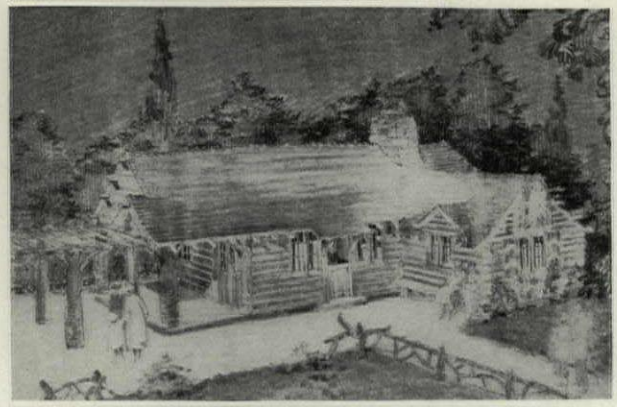


GENERAL HOUSE, INC.
Howard T. Fisher, Architect

with sectional wall portions bolted to them, as well as to the roof, with interior surfaces of finished insulation panels, decorated to meet the owner's desires—and the exterior wall face of pressed steel panels with interior partitions of sound-deadened insulation panels showing upon both faces. This expresses the most mechanical of all the designs shown, both in exterior and in plan, with no pretense to or recognition of elements of either design or attractive appearance. And its plan expresses only the most ordinary pretenses toward commonplace "efficiency" to recommend it.

"The American Forest Products Industries, Inc.," is one of the two houses in the group to show a sloping roof. It has five rooms, all on one floor, and why so much space is used up in interior wall thickness does not appear—unless wall cupboard space is thus to be provided! Otherwise the plan might be improved by opening into one area the space now apparently wasted at the right of the entrance. This plan also would seem better oriented if faced to the north. The usual wood frame is employed, surfaced outside with wide redwood boarding, and all the interior wall surfaces are made up of panels of differently selected and treated woods. Its cost is estimated at $4500 and it was designed by Ernest A. Grunsfeld, Jr.

The house erected by the Southern Cypress Manufacturers Association, "Hetherington, Architects," is not much different—in anything except possibly the kind of wood employed—than most "log cabins," in its architectural design. The type is already well established and known, and is both appropriate and adaptable to certain locations—usually limited to those in which the logs to be employed may be cut most logically and economically from the site itself. It is also usual that when the log material—because of its bulk and weight in transportation—has to be brought to the site over considerable distances, both the increase in cost is considerable and the house less adapted to being appropriate upon its site. In such a case, the material—cypress—would undoubtedly be better adapted to its location, if used in the form of the old handsplit cypress shingle or southern "shake," than which no other material weathers as beautifully or lasts as long, and upon which the transportation cost would be reduced to minimum weight and bulk.



SOUTHERN CYPRESS HOUSE
Hetherington, Architects

The advantages of cypress, as a material, should be familiar already to every architect. It is adapted to expression in many types of pleasing and informal architectural design, whereas the "log cabin" is much more restricted in its applicability to use as a dwelling, except as a "hunting lodge," and it can hardly appear to great advantage upon the open and treeless spaces of the "Lake Front" at Chicago.

"The Tropical Home," by Robert Law Weed, Architect, is an exhibit prepared by the State of Florida, using Florida materials so far as possible in its construction and decoration, and is so placed upon a somewhat different basis than the other dwellings that have been reproduced. It is also intended to appeal to people of means, the cost being "approximated at $25,000." The plan is not available for consideration, but it is obvious that the dwelling is ample in area, the Living Room is two stories in height and much use is made of Travertine stone, the local coral rock, colored Spanish tilework, and ironwork on stairs and balconies. The Dining Room is even partly lighted through an aquarium along one wall, and other unusual tropical and attractive features are to be exhibited by the State by means of this dwelling that is intended to place before wealthy visitors some of the advantages of wintering in the Florida climate.

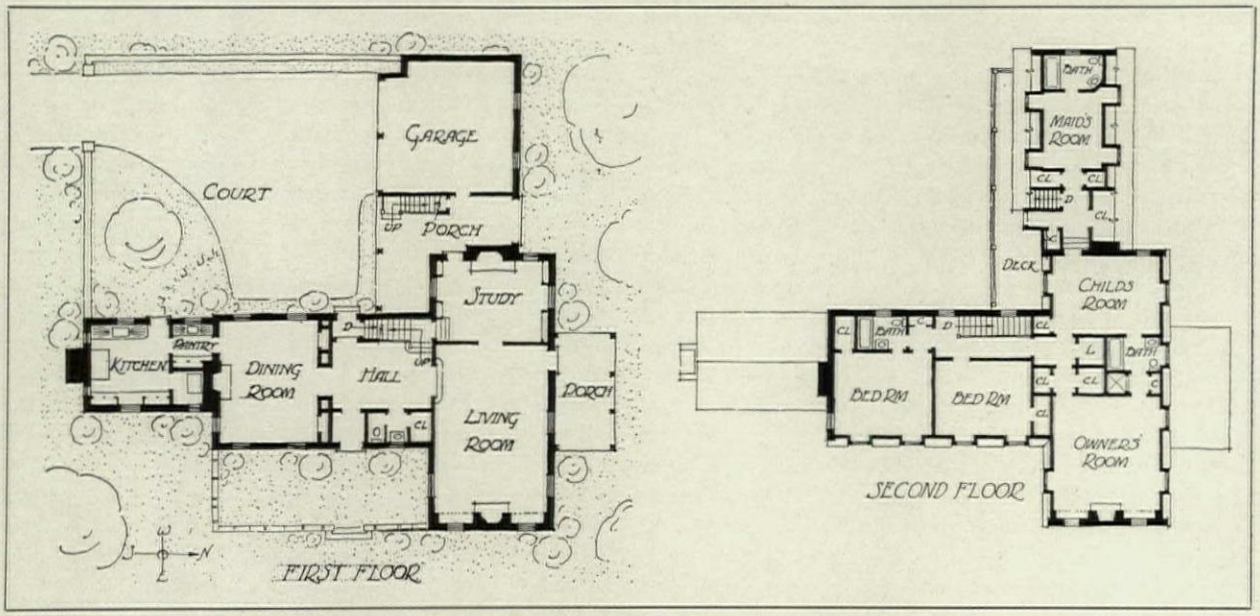
The next two plans are intended to display the uses of one of the oldest and most usual, as against perhaps the most unconventional, of all the materials and wall treatments advocated. "The Brick House," designed by Andrew Rebori, is "estimated" at $4500. "The House of Tomorrow," perhaps wisely, does not undertake to enter into the realm of conjecture so far. The unnecessary height and unusual irregularity of angles indulged in by this "Brick House" plan seem especially unnecessary and undesirable in an example supposedly intended to show the place that so historic and old a material as brick may still maintain in a "modern" type of house. Both its extreme height and the many odd angles and irregularities indulged in cannot help but increase the cost of construction of this example far above the amount given. "Reinforced brick" construction—the name given to a recently revived treatment, involving the introduction of small steel rods in the joints between the bricks to stiffen the construction against load or pressure—is susceptible of much merited and advantageous use once its principles have become more widely known to the profession, but it appears extremely doubtful if this example is a well advised way to display it to architect or home builder.

It is the intention to expose the brick construction on walls, floors and ceilings, inside and outside the structure. It has what is the equivalent of a four-room plan, with a laundry and basement upon the ground floor, and two additional stories placed above that. Whether any possible exposure could be suited or adapted to the peculiar arrangement of the windows and blank wall spaces shown upon these plans may be doubtful, but most certainly the experiment here tried, that of "facing" it to the west, is hardly successful.

"The House of Tomorrow," by George Fred Keck, obviously breaks so entirely with precedent, both as to form and material, that we have at least no complications—such as of "adaptation to site," or anything of that sort, to trouble us. As in the case of the "General House," all you have to do is to look at your catalog, order House No. 13, and let it go at that. It can look no better, whichever way you face it, and in this particular example it makes no particular difference on which of its twelve "faces" you approach it.

The second-floor plan seems a trifle old-fashioned and incompatible with modern ideas. Or perhaps this is merely another good old custom that has come around to be used again. Upon this floor all traffic is apparently routed from the hall and stairway through the Living and Dining Rooms, then the Kitchen (and we *have* known some housewives who would object to this!) and next Bedroom (A) to the Bathroom. Well, that may be the regular and accepted thing when living in glass houses—and is probably all right, so far as our own somewhat limited experience goes in the matter, we are unable to contradict it. But there is the occasional house guest *also* to be considered! He—or she—has also to follow the same circulatory route, and after traversing the inner, or more shadowed, end of the bathroom, he—or she—is at last able to enter his—or her—own habitat, Bedroom (B)! And the entire process would appear also to be followed naturally, not to say inevitably, reversed, before breakfast! This economy or simplification of plan, we seem to remember, has also its European precedent, being very popular indeed in the times of the later Louis', as still exemplified in the plans of Versailles, the Luxembourg, and other *grands maisons* of the period, when—to reach some more remote bedroom its occupant had to stroll through all the bedrooms in between—and we had ourselves always regarded it as having had something to do with the rather promiscuous habits that history tells us were indulged in by these same monarchs, along with some of their Court. But perhaps we are wrong, and overly suspicious. It may have been that the inhabitants of these princely precincts were merely going through a course of preliminary training for their reincarnation in these coming "tomorrows"—when we may all have to reconcile ourselves to the inconveniences (or conveniences—depending altogether upon how you may regard the matter!) of living in this kind of house.

A Present-day Residence Design Based on Early American Precedent



RESIDENCE FOR DR. HERBERT C. JONES, PETERSBURG, VIRGINIA

WILLIAM F. DREWRY, JR., ARCHITECT

Rendering by J. Floyd Yewell

Figures and Finance for the Architect

By Robert Lee Henry, C. P. A., L. L. B.

Editor's Note:—*This is the second of a series of discussions by Mr. Henry, who is recognized as one of the foremost authorities on the financial phase of the architect's work. He will answer on this page hereafter, in addition to writing a regular monthly article, all questions where a Certified Public Accountant can be of assistance. Mr. Henry has been closely allied with the Architectural Profession for a long period of time and at present, under the auspices of the New York Architects' Emergency Committee in connection with its program of "made work," is actively engaged in the supervision of the preparation of a Uniform System of Accounting for Architects. Inquiries of this nature are invited. Letters directed to Mr. Robert Lee Henry,* PENCIL POINTS, *330 West 42nd Street, New York City, will receive prompt reply. If a question is of general interest it will be published, unsigned, together with Mr. Henry's comments.*

Notwithstanding the usual technical difficulties confronting the Architect during the course of his artistic endeavors, the trend of the times has broadened the financial scope of the practitioner forcing him to enter the field normally occupied by the credit man.

Present-day conditions have naturally made it a requisite for the client to conserve expenditures as much as possible. In a great many instances, particularly so where the project is to be erected by the contractor for a fee based on a percentage of the cost, one of the results has been the entire elimination of the Completion Bond. Although the Architect may feel that this policy is "penny wise, pound foolish," expediency generally forces him to fall into line.

In the normal course of events, it becomes the Architect's duty to recommend a group of General Contractors who he considers are acceptable from the point of view of technical ability. However, he now has the added burden of selecting those financially able to carry out and complete the project and his recommendations must embody both qualifications. It is apparent that this added duty is not to be taken lightly; one disastrous undertaking by the contractor since the date of his last authentic credit rating might have changed the entire complexion of his financial standing. Furthermore, it is hardly fair to allow a general contractor to go to the expense of compiling a bid unless it is felt beforehand that his financial position is satisfactory.

While some small comfort is obtained from the realization that, in the final analysis, the client is to make the award, it is well known that the client is guided to a large extent by the Architect's opinion; also, that in the event of a default the work of the Architect is increased considerably. Thus, the task of weeding out the financial weaklings assumes weighty proportions; particularly, when the client expresses a desire to invite a favorite or some small unknown contractor to make a bid.

The Architect will find these new duties very much easier if he will follow a few simple rules of procedure.

The Joint Conference of Construction Practices (222 Munsey Building, Washington, D. C.) has issued a Standard Form of Contractor's Financial Statement for use in investigating the qualifications of bidders on public and private construction. With a few additional inquiries of a personal nature the data which the G. C. should be required to submit on this form will be sufficient. The statement is quite complete, in that it presents a Statement of Assets and Liabilities together with details respecting the amounts set forth on the Statement in bulk.

Intelligent study and analysis of the Financial Statement should result in a fair determination as to the financial responsibility of the prospective bidder. Naturally, the problem resolves itself into three major issues respecting status and the all-important moral issue. Eliminating, for the moment, the moral question, the three major issues may be classified as follows:

1. What is the liquidity of the assets?
2. What is the relation of the liquid assets to the liabilities?
3. Does a study of the first two points indicate that the Contractor will have sufficient cash at the "high point" of the job?

With respect to the first point, it is obvious that, in these times, only liquid assets (cash or items readily convertible into cash) can enter into the calculation. Such items as Accounts Receivable should be carefully examined and discounted. Accrued Interest, Real Estate Investments, Materials Inventory, Equipment and Furniture and Fixtures, while they may have value to a going concern, must be painstakingly discarded. From the point of view of financial responsibility, only such items as can be quickly realized upon should be considered. It is necessary to take the impersonal, cold-blooded attitude that is assumed by the banker when approached for a loan. Accounts Receivable, Stock in Trade, Goodwill, and Intangibles receive little consideration under the present-day system of valuation and all that one may borrow on such items is a great amount of sympathy. Furthermore, the days when a General Contractor could toss his signed contract on his banker's desk and demand and obtain a substantial loan have definitely passed.

Through careful study and elimination, the asset values set forth on the statement can be brought down to "rock bottom" figures. Having done so, it is wise to require that the remainder of the assets be at least three times the liabilities. A relationship of less than three dollars of assets to one dollar of liabilities is generally considered unsafe and perhaps an even greater margin of safety should be demanded. In the event

that some of the liabilities are secured by good liquid assets, it is much more conservative, in arriving at a valuation, to eliminate remaining equity in the assets on the theory that a forced sale brings less.

The third and last point with respect to the financial angle—Are the remaining liquid assets sufficient to carry the G. C. over the high point of the job?—largely depends upon the terms of the contract. Having knowledge of the agreement between the Client and the G. C., and of the percentage which the G. C. will withhold from his subcontractors, it is necessary to calculate whether the G. C. has or will receive, during the course of the work, sufficient funds to carry him over the period when his cash outlay on the job will be at its height. Normally this point occurs between the commencement of activities and the first payment, and again when the job is ready for final approval.

Of course, a great deal of care must be exercised to determine whether or not there exists the likelihood that payments to the G. C. will be used for private purposes. Enter, the moral phase of the situation. When it is considered that the professional reputation of the Architect is involved and, further, that the finished work of the Contractor is the yardstick by which the Architect's work is measured, it is not unreasonable for the Architect to thrust his inquiring rapier deep into the financial and moral mid-section of his prospective associate.

Questions and Answers

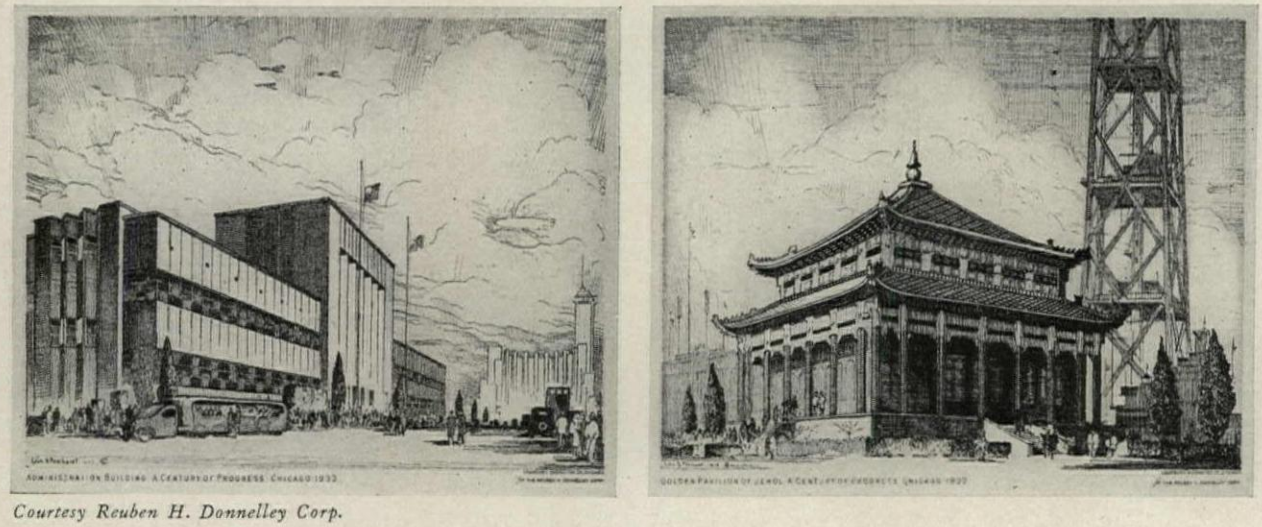
Question:—We have always been interested in the question of the proper method of applying overhead to the specific jobs. Granted that we have kept our overhead expenses down to what we now consider a minimum, what do you consider the best method of apportionment? To state our specific case briefly, we are equipped to handle a great deal more work than we have on hand and we are carrying some "old-timers" hoping for better days.

Answer:—In times like these you must be prepared to carry some of this overhead as part of your administrative expenses. You cannot expect the job cost account to absorb all of your overhead when admittedly you are carrying idle men.

This type of situation is one of the best illustrations in favor of the "time" basis of distributing overhead.

Briefly speaking, the time cards are added up and a distinction is made between productive time and non-productive time. The total number of employment hours is divided into the total overhead and an hourly overhead rate is established. This hourly overhead rate is multiplied by the number of productive hours spent on each job and the job cost account is charged with the resultant amounts. The balance of overhead unabsorbed is charged against Administration Expenses.

To carry out this system it is necessary for principals to keep time-cards as well as draftsmen and others directly connected with productive work. Wherever possible, secretaries and clerical assistants should also keep time-cards as thus will the calculation reach a finer degree of accuracy.



Courtesy Reuben H. Donnelley Corp.

TWO ETCHINGS BY LEON R. PESCHERET OF CHICAGO

FROM A SERIES OF TEN VIEWS BY THIS ARTIST OF THE CENTURY OF PROGRESS EXPOSITION

Size of originals, 5⅛" x 4"

Ripley's Recipes

By Hubert G. Ripley, F.A.I.A.

"The bubble winked at me and said,
You'll miss me, brother, when you're dead."

OLIVER HEREFORD.

It was with not a little hesitation that that distinguished philosopher, Senator of France, *gourmet, voyageur,* member of several learned societies, and kindly benefactor of the human race, Anthelme Brillat-Savarin, undertook in his declining years the composition of his famed *"Physiologie du Gout."* It is one of the most delightful books ever written, and the one on which his fame chiefly rests. The spirituality and high-minded character of this genial *bon vivant* and *raconteur* shines on every page. His love of humanity and efforts for their amelioration is in evidence throughout all his *"Méditations," "Variétés"* and *"Esquisses."* One of his aphorisms was—"The discovery of a new dish gives more enjoyment to mankind than the discovery of a new star": an even more famous one—"Tell me what you eat, and I'll tell you what you are."

Among the many lists of ten books indispensable for a lonely sojourn on a desert isle, I have never seen mentioned the *"Physiologie du Gout,"* yet what other work could so delightfully supplement the doubtless wise selections of the master minds who do our thinking for us?

The mental processes of *homo-sapiens* and his capacities for enjoyment are varied and complex to an almost infinite degree. The cultivation of man's taste is the primary duty of all good architects and the resultant æsthetic emotion produced, a lenitive to his spirit.

Example: In one of our great Institutions of Learning the custom is to give, each winter, lectures on the Fine Arts illustrated with lantern slides. A number of years ago, the holder of a traveling fellowship, recently returned from foreign study in France, Italy, and Greece, was advertised to give an illustrated lecture on architecture. This he did, punctuating his discourse with comments on each slide as it appeared on the screen facing the attentive auditors and absorbed spectators. When the slide showing the Parthenon flashed out in all its magnificent glory and grandeur, despite the ravages man had wrought and the gnawings of the relentless tooth of time, an awed hush fell over the assembly as it always does whenever that masterpiece of Ictinus and Callicrates and the matchless glories of Phidias appear.

"This, ladies and gentlemen," announced the lecturer, "is the Part'enon. It is considered by authorities as the finest building in the world. I t'ink it's pretty good!" A remark well deserving a prize for understatement.

The Greeks had a recipe for their masterpieces, just as the Egyptians had for theirs. The former was undoubtedly derived from or at least a metastasis of the latter through the introduction of such qualifying modalities as the amenities of the situation seemed to justify. Great blocks of stone were used liberally by both peoples in their buildings. These were either roughly shapen, mathematically trued or refined to the utmost limit of suavity as the taste of the masterworkmen and the æsthetic sense of the cultured classes demanded.

Savarin remarks that man is born a roaster, but becomes a cook. Likewise man is born a worker (tecton) and becomes an architect (architecton) through study and cloistered meditation in our halls of learning, and in the studios of the masters. The genius of the masterworkman shines out in the fashioned stone, just as the genius of the skilled chef is radiated from a perfect omelet, or the art of the vintner imprisons the golden sunshine of the *Côtes d'Or.*

Take one of Eph's orange blossoms for example. Eph was a masterworkman if there ever was one. Slight of figure, alert, genial, and, when need be, a martinet, he ruled the destinies of the altar of Dionysius in the Winter Place Tavern. The altar is still there, but, ehu! Eph is departed, like the sacrificial vessels and implements of his craft, the Elixirs, Tinctures, Infusions, Ingredients, and Cordials from which he so skillfully compounded and concocted for the assuagement and benefit of a grateful world.

Let's see, where were we, oh yes, the Orange Blossom! On those crass tipplers whose chief idea is quick action and plenty of it, Eph's Orange Blossoms would be wasted, almost a total loss in fact. Now, in very truth, we must admit that we have drunken many an unworthy orange blossom when Suburbia was at play. One simply cannot take raw alcohol, water, orange juice, and shake it up with a little ice and hope to go very far, that is if you have any regard for your reputation as an amphitryon. Many have gone far too far after imbibing a dozen or so. Eph used to take a large bar glass (a bar glass, my children, is a straight-sided glass holding six or eight ounces; a large bar glass holds twelve or fourteen), fill it two-thirds full of finely shaven ice from a silver scoop, add a scant half-teaspoonful of powdered sugar, the juice of somewhat less than half a small lemon, the juice of one-half a goodly orange, preferably a sun-kissed navel, one or two drops of gum tragacanth, and two fluid ounces of Booth's Old Tom, clap on the nickeled top and shake until frost formed outside the metal. Meanwhile a slender-stemmed glass, full of shaved ice to keep it cool, had been standing before you. This was now dumped out and the contents of the shaker strained into the chilled cup, Eph raising his arm in a graceful arc as he did so to make the corolla of bubbles (or Baily's beads as they are sometimes called) that should be the crowning motif of the Perfect Orange Blossom. This is a simple beverage for the beginner's class, and in addi-

tion to its highly palatable qualities it contains a large percentage of valuable vitamins.

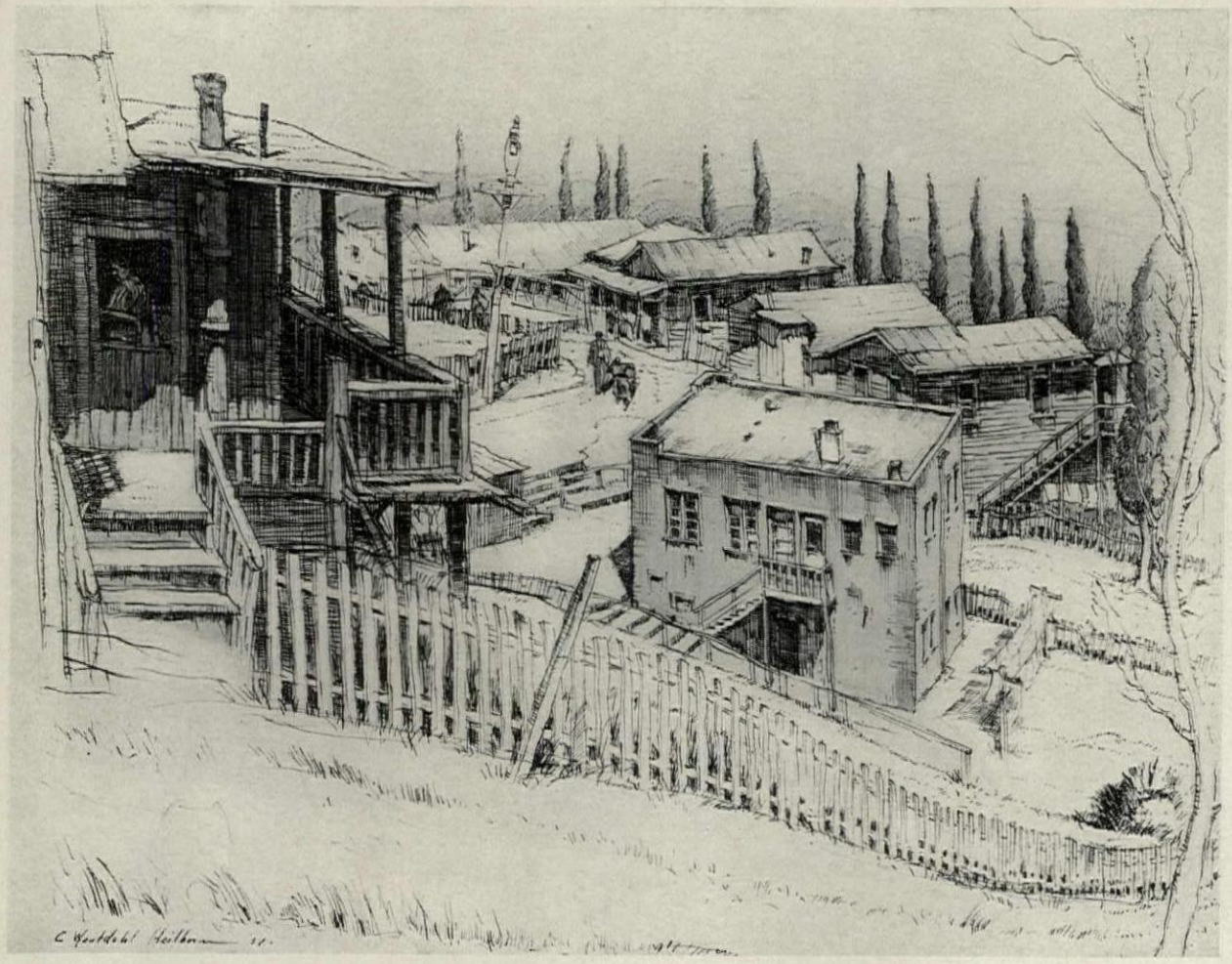
The chief qualification of a cook, Savarin says, is exactitude, and if this recipe is faithfully followed and discretion exercised in the consumption, not only will the whole system be invigorated and refreshed, but little peewees and nut-breasted hatches will be singing pæans to your soul. Don't make the mistake of drinking more than one of these (well, maybe two, or in extreme cases, two and a dividend—or three at the very utmost), for, just as after two or three glasses of the finest wine in the world, the palate becomes dulled to the finer appreciations, so the capacity for enjoyment is lessened by unmeet repetition of the Orange Blossom.

A single Doric Column, for example, when fashioned by the hand of the masterworkman, is an object for admiration. A flock of them are even finer when skillfully composed in rhythmic cadence, but a flock of Orange Blossoms soon becomes a surfeit. The analogy does not hold here even though the same artifice that quarried the rough block from the mountainside, or extracted it out of the bowels of the earth and made of it a work of art, applied in a different métier, produced the Orange Blossom from the distillations of Nature's storehouse above those quarries, and in the dells and bosquets of the smiling hills. One art is dynamic, the other static, though the emotions produced by both may be subjective.

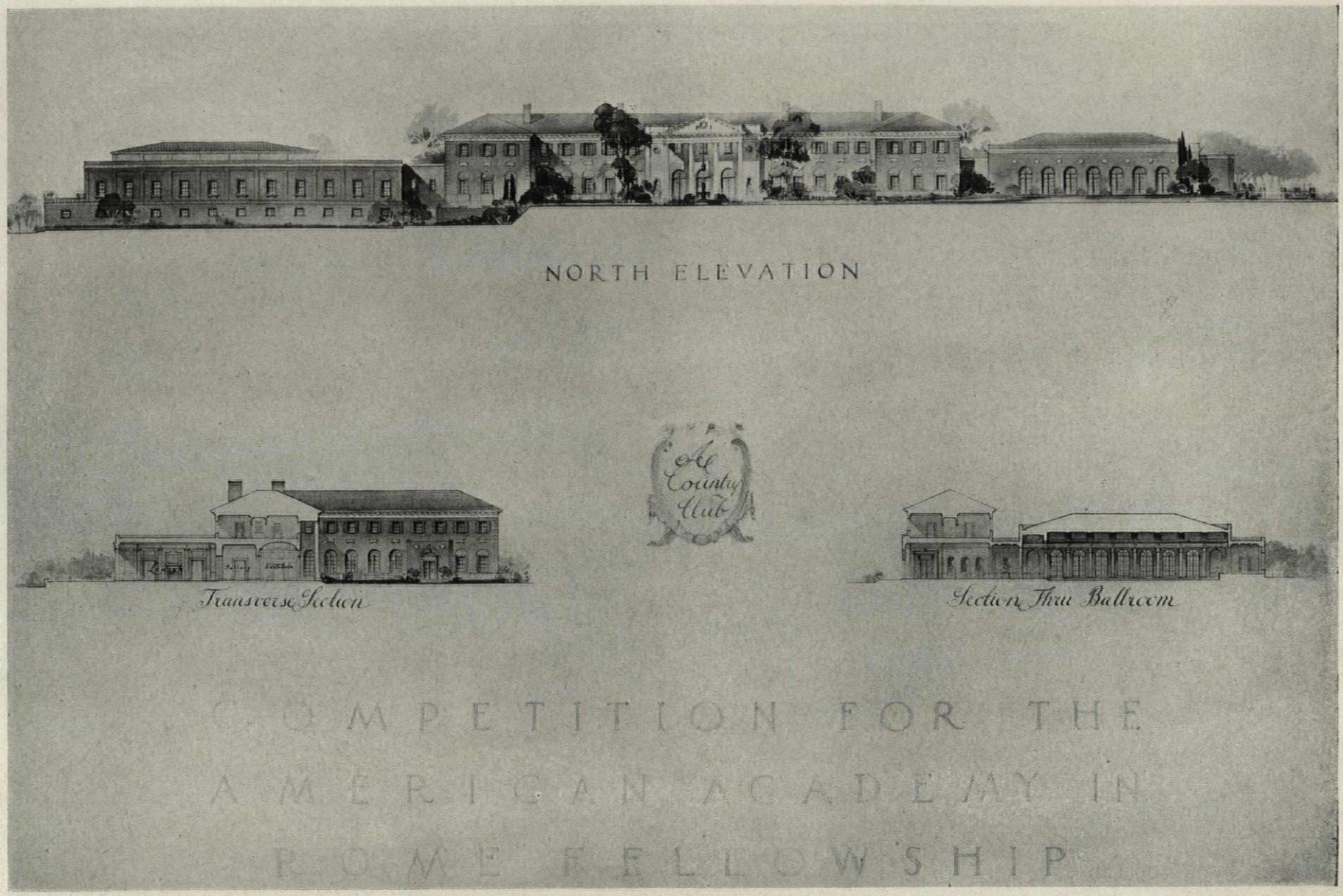
NOTE: When the above passage was written, there was a thought there (though evidently somewhat difficult of expression) that seemed clear at the time. On reading over the proof, I'm at a loss to remember just what the meaning was. However, as there is a bare possibility that the words may carry a message of solace for some tortured soul, it may as well stand. Readers who have not fortified themselves with at least three Orange Blossoms are advised to skip it.—*Author.*

But to return for the moment to the kindly savant Anthelme, and the cult of that sweet smiling tenth Muse, the goddess Gasterea, a verse from the *Élégie Historique* with which the distinguished author closes his contribution to the Fine Art of living may be in order here.

Aspasia, Chloe, forms divine
Th' immortal chisle of th' Greeks hath wrought,
Despair of beauties of our time,
Those luscious lips did never close
On meringue vanilla, nor e'en of rose:
Nor passed your epiglottis naught
Save humble gingerbread and wine.
Gee! how I pity you your lot!

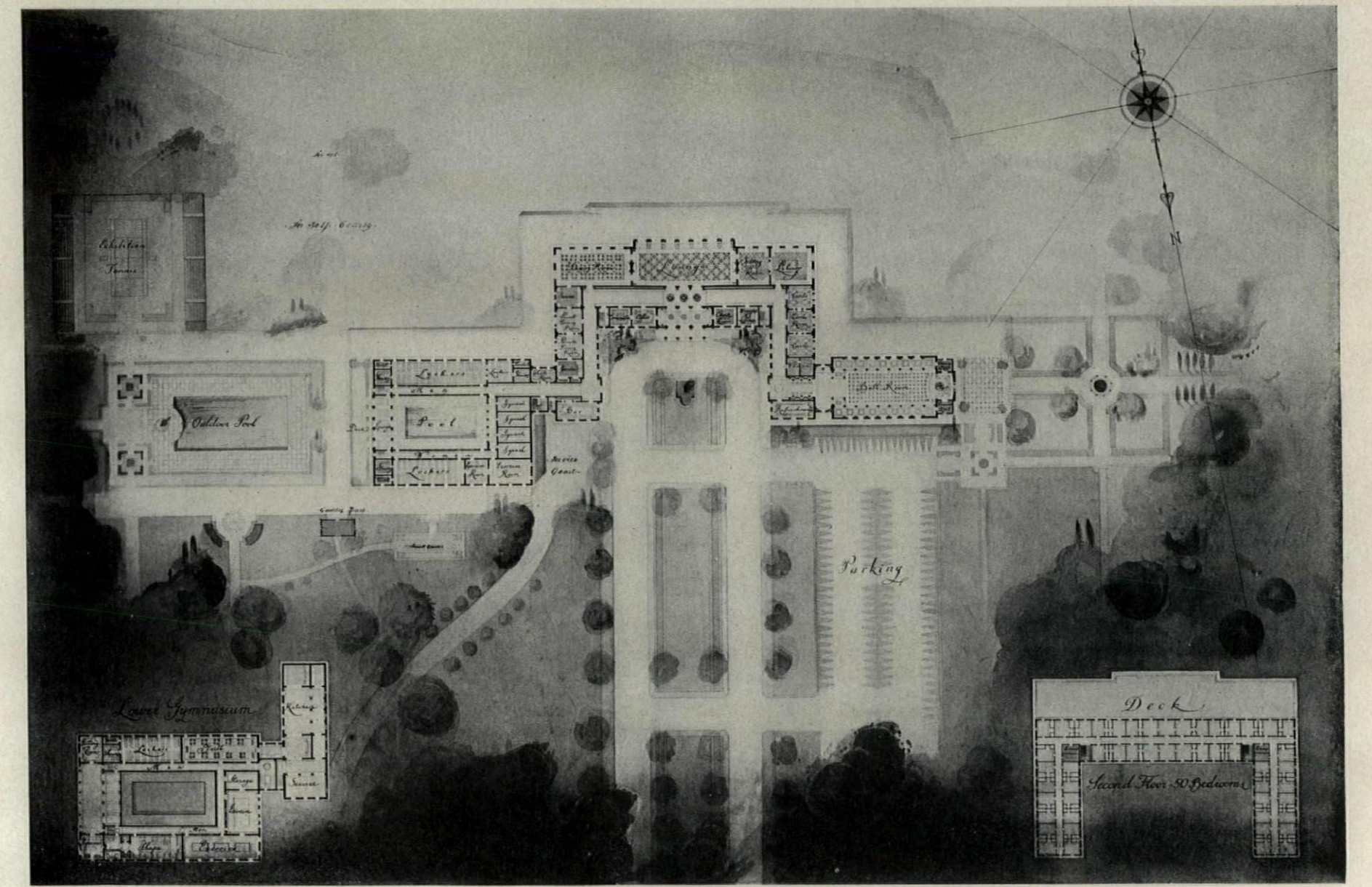


"MEXICAN HOMES, LOS ANGELES"—FOUNTAIN PEN AND WASH DRAWING BY C. WESTDAHL HEILBORN



ELEVATION AND SECTIONS—PRIZE WINNING DESIGN FOR "A COUNTRY CLUBHOUSE," BY OLINDO GROSSI

COMPETITION FOR THE ROME PRIZE IN ARCHITECTURE, 1933



PLANS OF PRIZE WINNING DESIGN FOR "A COUNTRY CLUBHOUSE," BY OLINDO GROSSI

COMPETITION FOR THE ROME PRIZE IN ARCHITECTURE, 1933

Modern Air Conditioning, 1

By Harold L. Alt

Editor's Note:—*The first part of this article, presented this month, is devoted to a discussion of the basic factors upon which the modern science of air conditioning is founded. An understanding of these factors by the architect is essential if he is to know his way about among the various types of apparatus now on the market and which he may be called upon at any time to specify for jobs ranging in size from large auditoriums or department stores right down to the small house or apartment. Part 2 will cover the various types of equipment used in central plants for modern air conditioning, as well as the application of unit air conditioners. Charts shown in Figures 3, 4, 5, 6, and 7 are based on data developed by the A.S.H.V.E. Research Laboratory, Bureau of Mines, Pittsburgh, Pa.*

In recent years, a more and more predominating tendency to separate the terms "ventilation" and "air conditioning" is becoming apparent, *ventilation* gradually being relegated to its original meaning of *a movement of air* while air conditioning is coming to be the term applied to the matter of *air treatment*. Some engineers expect ultimately to see the complete obsolescence of the word "ventilation" although this, perhaps, is an enthusiast's viewpoint. In years gone by the idea which formed the basis of all ventilation theory was that it was necessary to approach (inside of the structure) an air condition as nearly approximating the outside air condition as possible except perhaps in regard to the matter of temperature. By this was meant that the greater the amount of air circulated through a building the less would be the relative contamination per cubic foot and the nearer this air would approach that of the outside air in average condition. Of course it was expected to heat this air to a comfortable degree, and it was so heated, with the resulting heavy coal consumption and high cost of operation.

This viewpoint is now found to be entirely erroneous and has been discarded by the leaders in the industry. In fact, the old conception of ventilation was largely a by-product of the medical profession's misconception of the physical and bodily requirements as far as air is concerned. The heating and ventilating engineer always has had to labor under the handicap of being able to produce any reasonable air conditions inside of a building as soon as anyone told him what was desirable and then having no one to state authoritatively just what these conditions should be. After years and years of this uncertainty the engineers themselves began to feel that to arrive at any satisfactory conclusion a certain amount of research work would be necessary. This conclusion was crystallized by the studies made by the New York State Commission on Ventilation which made some very exhaustive tests, particularly on school ventilation conditions, and published the results of these tests as indicative, but not conclusive, of some of the features which research might disclose. The extreme interest in the subject of ventilation led to widespread discussion of the Report of the above-mentioned Commission and the advocates of various theories eagerly sought for confirmation of their views in the data collected by this body. One of the unexpected results of this report was the rise of the so-called "window ventilation" idea which claimed to be justified by the investigations of the Commission.

Worse than this, certain parties, either through carelessness or a mistaken idea of economy, began urging that the open window was the *only* necessity of good ventilation, entirely forgetting that the Commission had laid down certain requisites to go with the open window and without which the open window is no more than just that. The controversy soon reached the stage of intense feeling between the ones who urged that an open window was all that was required (pointing to the economy of such an installation as its justification and to the Commission's report as upholding it) and the more conservative engineers who foresaw that uncontrolled ventilation never could answer the question satisfactorily, owing to the fact that window ventilation was subject to the idiosyncrasies of the individual teacher and the wind as to how much or how little air actually would be received.

With this controversy as an impetus, many heating and ventilating engineers felt that it was high time that some *facts* were collected that could not be misconstrued in their implications and which would be basic in their nature. As a result of this feeling the Research Laboratory of the A.S.H.V.E. was formed to work in conjunction with the Bureau of Mines and with the experimental equipment of this bureau. This work now has been going on for a number of years and already has resulted in establishing such items as the Comfort Zone and Comfort Line for both winter and summer, Effective Temperatures, Effects of Air Movement on Effective Temperatures, Total Heat Emitted by the Human Body under Different Surrounding Temperatures, the division of this total heat into sensible and latent heat, and a Heat Meter for determining the heat transmission through structural materials in a consistent and authoritative manner. The work is still going forward. Many of the older ventilation theories have suffered severe jolts as a result of this research work and it is not beyond the realms of possibility that more theories will have to be discarded in the face of cold and scientific facts that may be uncovered in the future.

As this research work was in progress, cooling work began to assume a much greater importance in ventilating installations. This was at first confined largely to theater work and auditoriums where the effect of body heat and closely confined human beings is at a maximum. It was about this time that "air conditioning" began to be talked about and the use of the term was at first rather limited to ventilation where cooling was done. Since then, air conditioning has grown to cover air treatment including cleaning, humidifying, cooling, deodorizing, etc., as distinguished from air which is injected into the structure either heated or unheated but otherwise without any treatment to make it more desirable for human use and comfort.

One of the first factors which made itself felt when the artificial cooling of buildings was undertaken was that of cost of operation. It soon was demonstrated that if all the "foul" air removed from the interior were discharged to the atmosphere and an entirely new supply of fresh air were furnished constantly from the outside, the cost of operating the plant would, in the majority of cases, be prohibitive. This is because the "foul" or exhaust air

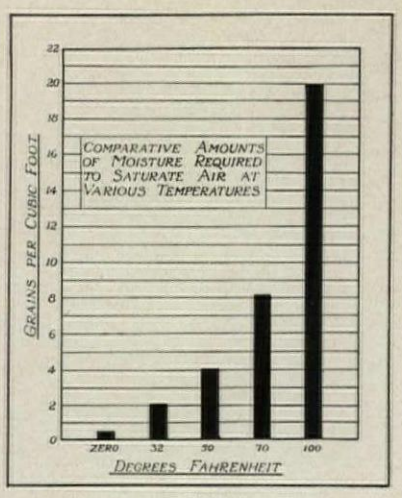


FIGURE 1

has been cooled and is at the temperature of the cooled space when exhausted, while the outside air may be considerably higher in temperature, depending on what the outside temperature may be at any particular time.

The second loss occurred in the fact that air supplied to the interior for cooling purposes usually had to be dehumidified, or have part of the moisture removed, which made the air in the cooled interior dryer than the outside air. When fresh air constantly was used, this dehumidification was carried on at 100% all the time. On the other hand, if a large portion of the "foul" air which has been dehumidified and cooled can be taken from the interior of the building and retreated by means of "recirculating" through the apparatus, then the load on the equipment correspondingly is reduced and a considerable economy effected. From this the practice of "recirculation" has been developed and actual experience in theaters has shown that about 66-2/3% to 75% of all the air supplied may be recirculated before the odors accumulating become pronounced enough to become objectionable.

This practice of recirculation has now extended to practically all "comfort" cooling installations—by which is meant all cooling done for body comfort as distinguished from "process" cooling in manufacturing and industrial plants. A score of years ago an engineer suggesting taking the air out of the "foul air sewer," by which some architects used to designate the outboard exhaust duct, would have been classed a disgrace to the profession. Now, however, all engineers are doing this very thing in view of the FACT that it has been proved to be practical and that no bad results on occupants have been indicated in any way.

Humidity and Its Effects

Humidity and its effects on the warmth sensations of the human body also has received much more careful attention than previously and is one of the few factors in ventilation which has not had its basic principles upset by research and experiment. It was known that heavily humidified air produced greater discomfort to the body in temperatures considerably above and below 70° F., but just how these sensations correlated with sensations produced by dryer air was not known and was only determined after exhaustive experiment. Humidity is one of the most important features in cooling, as it determines not only how much comfort or discomfort will be experienced under the conditions maintained in the building but also determines to a very great extent the amount of refrigeration necessary due to the relatively large amount of refrigeration capacity required for the removal of moisture from the outside air. Cooling the incoming air is only a portion of the refrigeration load; the larger part usually consists of the removal of moisture either from the incoming fresh air or from the recirculated air which has picked up moisture in the building from various sources such as the human body, damp clothes, vapor from steam operated equipment, etc.

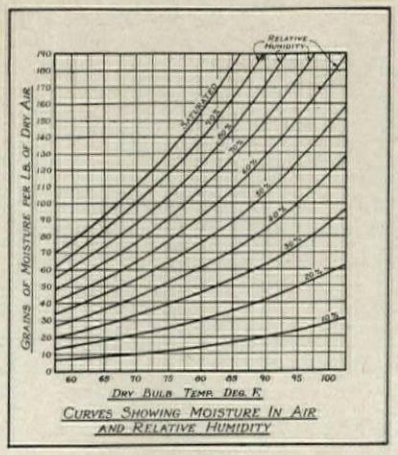


FIGURE 2

Each pound of air is capable of carrying a certain amount of water vapor at any given temperature and no more. If this amount of vapor is exceeded, precipitation results and the excess moisture is squeezed out of the air. The actual weight of vapor in air is called the *absolute humidity* and, when the air can contain no more vapor without precipitating, the air is said to be *saturated*. If, however, the air is not saturated and only contains a fraction of the moisture which it could carry at that particular temperature, then the amount *actually contained* divided by the amount which it *could contain* will give a percentage which is termed the *relative humidity*. So relative humidity may be defined as the percentage of maximum moisture which the air may contain at any specified temperature; of course, when this percentage reaches 100, the air is saturated. See diagram, Figure 1.

It follows that if air has a higher vapor carrying capacity in warmer temperatures and a lesser vapor carrying capacity at lower temperatures as shown in Figure 2, it is possible to saturate it at a temperature sufficiently low so that when it is raised up to the temperature at which it is utilized the relative humidity can become whatever is desired. For example, it has been found that air saturated at a temperature between 50° F. and 55° F. will have a relative humidity around 50% when raised to 70° F. in the room. This is considered almost ideal. On the other hand, the condition of 50% relative humidity produces on the human body a sensation of comfort comparable with some higher temperature with a lower relative humidity and with some

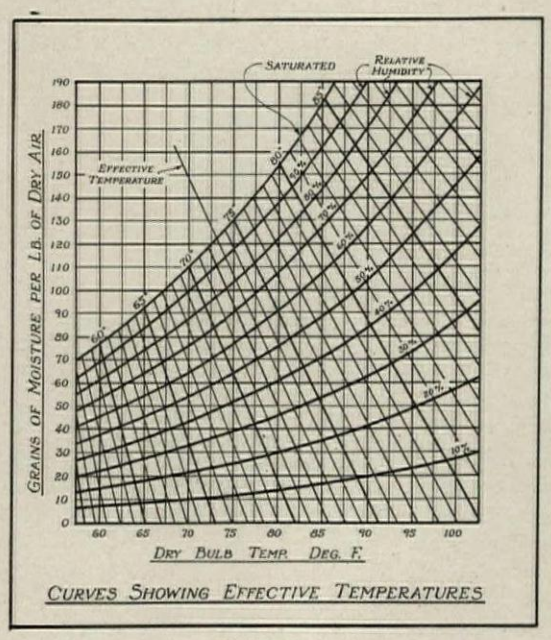


FIGURE 3

lower temperatures with higher relative humidities, so that almost exactly the same temperature sensations will be experienced under various differing conditions. It is highly desirable to know what temperature will be necessary to give the most desirable comfort condition under various differing relative humidities and air conditions so that one or the other can be adjusted to give the maximum comfort condition. The lines determined by experiment for these different conditions are known as the effective temperature lines or simply "effective temperature" and are based on the comfort condition at the dry bulb temperature noted and with saturated air at that temperature.

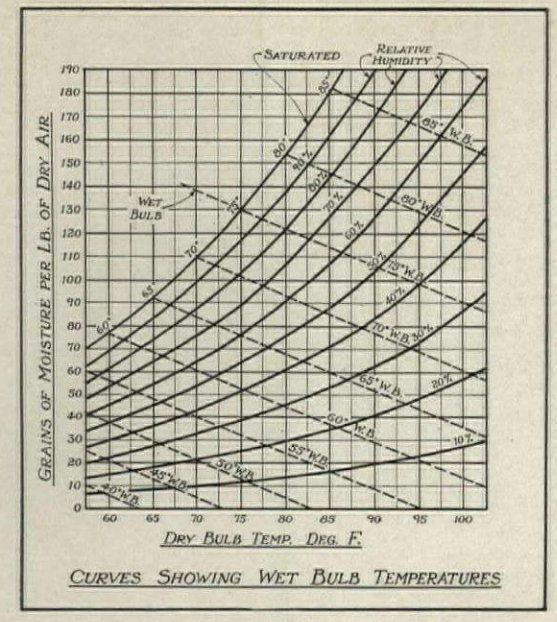


FIGURE 4

Effective Temperature

All work in air conditioning, and even in heating as well, henceforth must consider "effective temperature" rather than dry bulb temperature. The dry bulb temperature is that indicated on the ordinary dry bulb thermometer and it has been realized for some time that the sensation of warmth experienced by the body is greater in heavily humidified air than it is in dryer air of the same dry bulb temperature owing to the evaporation from the skin being greater in the dryer air. Careful tests have been made and lines of effective temperature have been developed showing what the effective temperature, or body sensation of warmth, will be for every dry bulb temperature and percentage of humidity that may be expected in practice, these being indicated in Figure 3. For example, 70° F. dry bulb and 50% relative humidity fall on the winter comfort line and will satisfy 97% of all persons; but this is an effective temperature of 66° F. A dry bulb of 68° F. and a relative humidity of 70%, or a dry bulb of 72½° F. and a relative humidity of 20%, will give exactly the same temperature sensation to the body, will satisfy 97% of all persons and also will fall on the 66° F. effective temperature line.

Consequently, the fact that a thermometer hanging on the wall says 68° F. does not prove that the room may not be producing comfort conditions equal to one having a similar thermometer reading 71° F. provided that the humidity conditions are right in the two cases to do so. This shows that the dry bulb thermometer no longer can be recognized as the true index to room temperature and upsets another basic — or supposed basic — foundation on which heating and ventilation formerly were designed.

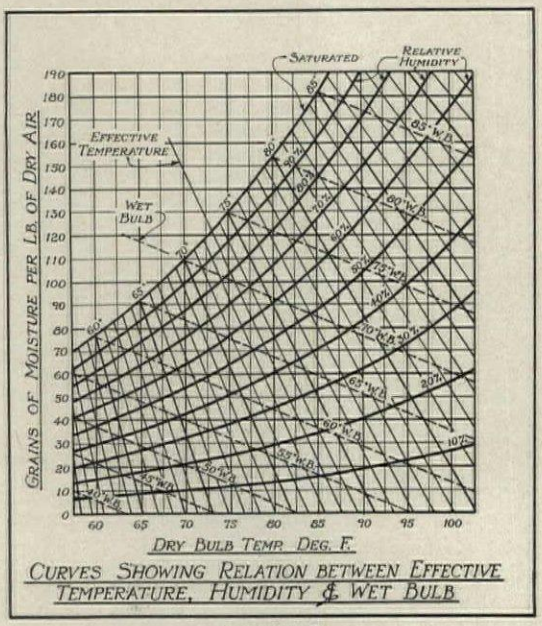


FIGURE 5

Wet Bulb and Dry Bulb Temperatures

The use of the wet bulb and dry bulb thermometers (usually mounted on a board having a handle and swivel joint so that it can be rotated by hand) is the method employed to ascertain the relative humidity in any room or space. The dry bulb thermometer is the ordinary Fahrenheit thermometer and gives a temperature reading corresponding with the ordinary wall thermometer; the wet bulb is a similar thermometer except that a small piece of damp wicking is placed over the bulb and when swung around in the air this wicking begins to have the water evaporated or—in other words — starts to dry. The process of evaporating water requires the supplying of a certain amount of heat, this heat being the latent heat of evaporation under atmospheric pressure, and the result is that the wicking is cooled and causes a reduced reading on the thermometer to which it is attached. This reduction is termed the wet bulb "depression" and begins at zero when the air is saturated, reaching a maximum when the air is absolutely dry. Of course absolutely dry air is never obtained naturally but the lines shown in Figure 4 indicate how much the wet bulb will read below the dry bulb for any given percentage of relative humidity and at any given dry bulb temperature.

Conversely, if the wet and dry bulb readings are obtained in a room, the corresponding percentage of relative humidity at the room temperature can be obtained from the same chart. The reason there is no depression when the air is saturated is because that air under such a condition can absorb no more moisture and therefore there is no evaporation from the wicking and no cooling effect on the wet bulb. It must not be forgotten that vapor would occupy the same space if no air were present but as air is always present it is customary to speak of air rather than vapor. The relation between effective temperature, wet and dry bulb temperatures, and humidity is indicated in Figure 5.

The Comfort Line

The comfort line may be defined as the degree of *effective* temperature at which about 97% of the average run of persons will feel comfortable; it is around 66° F. effective temperature in the winter season and 71° F. during the summer season. It is obtained entirely by experiment and will vary somewhat with persons slightly active or

sitting still, and with still air or a slight air movement. The figures of 66° F. effective temperature for winter and 71° F. for summer conditions are for persons normally clothed, slightly active, and in practically still air conditions. It has proved impossible to find any temperature, or combination of temperature and humidity which will suit 100% of the population. This suggests taking a liberty with Lincoln's famous statement so that it should be made to read, "You can't suit all of the people any of the time" as far as temperature and air conditioning are concerned.

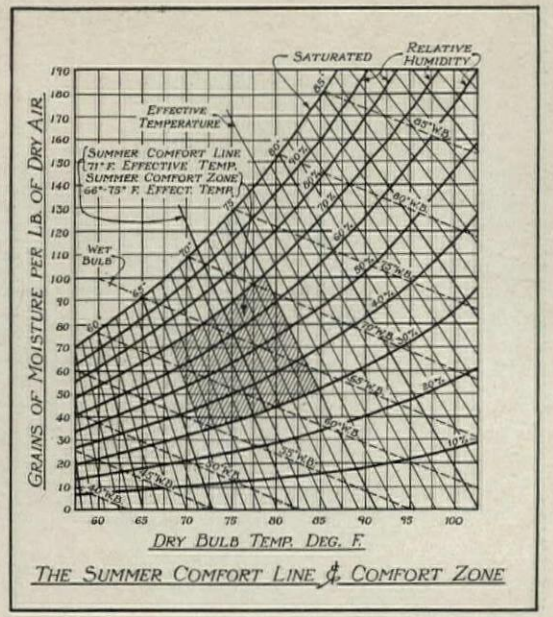


FIGURE 6

The Comfort Zone

On each side of the Comfort Line there will be found a diminishing percentage of people who are satisfied by the effective temperature until a minimum of 50% of the occupants are suited. This area is termed the Comfort Zone; it extends 3° F. effective temperature below the Comfort Line and 5° F. effective temperature above the Comfort Line for winter conditions. In summer it extends 5° F. below the Comfort Line and 4° F. effective temperature above the Comfort Line. This brings out a very simple definition of the Comfort Line as including any set of conditions under which 97% to 98% of the people are comfortable and the Comfort Zone as any set of conditions under which at least 50% of the people are comfortable. Experience has shown up one very peculiar fact in regard to the summer Comfort Zone and this is that, in an artificially cooled building, it is not practical to keep the effective temperature within the summer Comfort Zone on the hottest days. This is simply because such a condition inside of the building produces too much of a temperature shock to persons coming in from the outside conditions and is likely to result in colds before the bodies of the newcomers can re-adjust themselves to the more comfortable set of conditions, however desirable these conditions may be for long-time intervals of occupancy. The maximum difference which now is considered as close to the desirable limit is about 10° F. effective temperature below the outside effective temperature. Comfort lines and comfort zones for winter and summer are shown in Figures 6 and 7.

Air Movement

Air movement in a room always has been a thing which engineers have tried to guard against even with purely ventilating systems; register outlet velocities were kept down to 250 feet per minute through the grille; inlet registers were placed 8 feet above the floor to avoid face draughts on people passing such outlets; registers were made of moderate sizes on the supplies; and so on. When cooling was first experimented with, the danger of draughts became even a more serious question as it was found that, while draughts of warm air were objectionable, draughts of cooled air positively were dangerous and gave rise to many complaints.

Even greater efforts at distribution proved to be necessary and the introduction of air at temperatures more than 15° F. below that maintained in the room indicated that the air was likely not to diffuse quickly enough before striking the nearest occupants. Some designers even like to go no lower than 10° F. below the room temperature. Yet air movement in a room as low as 100 feet per minute will produce a feeling of coolness equivalent to a drop of about 1½ degrees in effective temperature and a movement of 300 feet per minute will produce a drop in effective temperature of four degrees in the effective temperature. This fact has given rise to systems now on the market which claim to produce "comfortable" conditions by the use of high velocity air which is not artificially cooled. Undoubtedly some air movement is better than no air movement, but further than this there seems to be little to recommend these systems outside of lower first cost of installation.

For example, if the interior heat developed in a room is such as to raise the room temperature five degrees above the outside for the quantity of air being supplied, then it is evident that a velocity of air movement in the room must be maintained at about 500 feet per minute in order to hold the room simply at the equivalent outside temperature. This velocity is too high for practical use as it is about twice as much as that attained through the ordinary supply grille. Lower velocities will do proportionately less but there is no gainsaying that the conditions in the room with any air movement at all will be better than simply with still air. To this extent such systems will be effective.

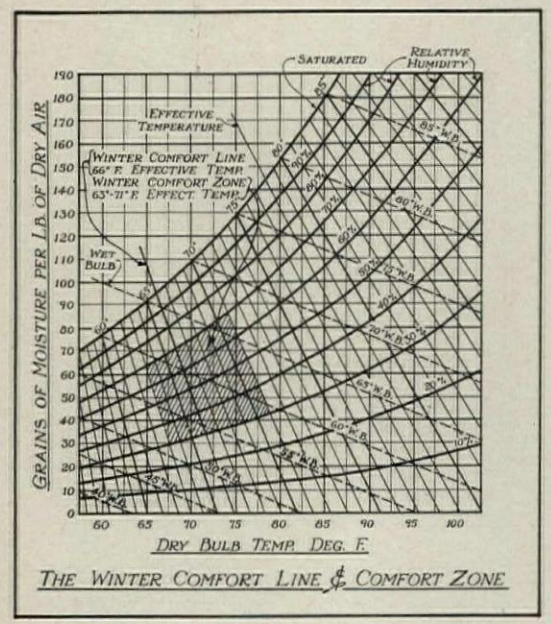


FIGURE 7

Body Heat

The total heat given off from the average human body when slightly active is very nearly a constant amount of 400 Btu. per hour from 65° F. to 87° F. effective temperature. This has been accu-

(Continued on page 26, Advertising Section)